

OCEAN GALES AND STORMS, MAY 1938

Vessel	Voyage		Position at time of lowest barometer		Gale began May—	Time of lowest barometer May—	Gale ended May—	Lower barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN													
Nemaha, Am. S. S.	Rotterdam	Tampa	44 54 N.	19 12 W.	1	11a, 1	2	29.65	W	NW, 6	NNW	NW, 9	
Leto, Du. S. S.	Galveston	Hull	40 25 N.	47 52 W.	3	7p, 3	3	29.33	SSW	SSW, 10	SW	SSW, 10	SSW, WSW.
Amsterdam, Du. S. S.	Batton Rouge	Avonmouth	40 15 N.	49 25 W.	3	11p, 3	3	29.45	W	W, 8	W	W, 8	W-NW.
Pres. Harding, Am. S. S.	Cobb	New York	42 55 N.	44 56 W.	3	4a, 4	5	29.24	SSW	SSW, 9	NW	SSW, 9	SSE-W.
Black Condor, Am. S. S.	Antwerp	do	45 30 N.	43 00 W.	4	8a, 4	4	29.34	S	SSW, 9	WSW	SSW, 9	S-WSW.
Steel Ranger, Am. S. S.	Gibraltar	Wilmington, N. C.	35 00 N.	45 54 W.	5	5p, 5	5	29.83	SW	SW, 8	SW	SW, 8	
Gand, Belg. S. S.	New Orleans	Havre	39 19 N.	56 08 W.	9	11p, 8	9	29.63	WNW	WNW, 7	WNW	WNW, 8	WNW-NNW.
Sundance, Am. S. S.	Charleston	Avonmouth	40 35 N.	48 51 W.	9	9a, 9	11	29.54	NW	WNW, 6	W	NW, 9	WNW-NW.
Speybank, Br. M. S.	Huelva	Philadelphia	37 11 N.	46 12 W.	9	10p, 9	9	29.83	SW	SW, 8	W	SW, 8	SW-W.
Manhattan, Am. S. S.	Cobb	New York	43 56 N.	44 32 W.	10	4a, 10	10	29.30	W	W, 9	WNW	W, 9	
Black Gull, Am. S. S.	New York	Antwerp	44 24 N.	42 30 W.	9	8a, 10	11	29.25	W	W, 9	WNW	W, 9	W-NW.
Vincent, Am. S. S.	Dunkirk	New York	46 36 N.	36 20 W.	10	2p, 10	11	29.11	SSW	WSW, 8	W	WSW, 9	SSW-WSW.
Tuscaloosa City, Am. S. S.	Avonmouth	Portland, Maine	47 54 N.	35 50 W.	10	4p, 10	11	29.07	SW	SW, 6	W	W, 8	SW-WNW.
Exmoor, Am. S. S.	Lisbon	New York	36 20 N.	58 40 W.	9	4p, 10	10	29.67	SW	SW, 7	SW	SW, 8	
American Trader, Am. S. S.	London	Boston	46 29 N.	32 37 W.	10	7p, 10	11	29.19	SW	SW, 9	W	WSW, 9	SW-WNW-WSW.
Bilderdijk, Du. S. S.	Rotterdam	New York	48 54 N.	21 27 W.	11	9a, 11	11	29.53	SW	SW, 8	SW	SW, 8	S-SW.
Syros, Am. S. S.	New Orleans	Bremen	41 30 N.	45 12 W.	12	9p, 11	12	29.80	W	WSW, 5	NW	WNW, 8	SSW-W.
San Jacinto, Am. S. S.	New York	San Juan	38 30 N.	73 05 W.	15	Mdt, 14	15	29.43	W	SSW, 7	W	W, 9	SE-W.
Speybank, Br. M. S.	Huelva	Philadelphia	38 25 N.	70 59 W.	14	5p, 15	15	29.46	SE	SW, 6	SW	SE, 10	SW-W.
Mormacster, Am. S. S.	Trinidad	New York	35 50 N.	71 50 W.	15	3a, 16	16	29.58	W	W, 8	WNW	W, 10	W-WNW.
City of Hamburg, Am. S. S.	Southampton	Norfolk	41 04 N.	60 07 W.	16	4p, 16	16	29.47	SW	SSW, 7	SSW	SSW, 9	SSW-WSW.
Bilderdijk, Du. S. S.	Rotterdam	New York	41 19 N.	55 28 W.	16	4p, 17	16	29.62	S	WNW, 4	S	S, 8	SSW-WNW-WSW.
Floride, Fr. S. S.	Havre	do	36 57 N.	49 35 W.	17	6p, 18	18	29.88	S	W, 7	WSW	SSW, 8	WSW-W.
Caledonia, Br. S. S.	New York	Moville	47 15 N.	47 20 W.	22	9a, 22	23	29.93	S	S, 6	SSW	S, 8	S-SSW.
Schuylikill, Br. M. S.	Belfast	Aruba	50 41 N.	10 15 W.	29	Noon, 29	29	29.43	W	S, 6	W	W, 8	S-W.
Rhode Island, Am. M. S.	Port Arthur	Liverpool	37 20 N.	65 30 W.	30	5p, 30	31	29.97	ENE	ENE, 7	NNE	ENE, 8	None.
Europa, Ger. S. S.	Cherbourg	New York	41 36 N.	49 54 W.	31	10p, 31	31	29.53	N, 9	N, 9	N, 9	N, 9	
NORTH PACIFIC OCEAN													
Hikawa Maru, Jap. M. S.	Vancouver	Yokohama	50 12 N.	177 18 E.	1	Noon, 1	1	29.42		NNE, 8		NNE, 8	
Pres. Jefferson, Am. S. S.	Seattle	do	51 59 N.	158 30 W.	2	3a, 2	3	29.14	SW	SW, 6	W	WNW, 9	SW-W.
Hoegh Hood, Nor. M. S.	Estero Bay	Tsudomatsu	35 18 N.	123 00 W.	3	4a, 3	3	30.10	W	NW, 8	W	NW, 8	
Tai Yin, Nor. M. S.	Yokohama	Los Angeles	47 13 N.	168 04 W.	10	5a, 10	11	29.98	W	NNE, 5	WSW, 7	WSW, 8	NE-NW.
Meigs, U. S. A. T.	Manila	San Francisco	19 20 N.	129 02 E.	13	5a, 14	15	29.24	NNE	SSE, 5	S	SSW, 12	SSW-SSE-WSW.
Tulsagas, Am. S. S.	do	do	41 37 N.	163 17 W.	14	1a, 16	15	29.60	S	S, 7	S	S, 8	S-SSW.
Manulani, Am. S. S.	Honolulu	do	36 54 N.	125 36 W.	18	4a, 18	18	30.01	E	N, 8	E	N, 8	
Nitro, U. S. N.	San Diego	Balboa	18 54 N.	105 00 W.	24	5p, 23	24	29.84	E	ENE, 2	E	E, 8	
Hermion, Nor. M. S.	Mojil	Portland, Oreg.	48 18 N.	171 06 W.	27	1p, 26	27	29.15	W	W, 6	W	SSW, 8	
Tsuyama Maru, Jap. S. S.	Yokohama	Los Angeles	43 52 N.	162 00 W.	29	1a, 30	30	29.77		WSW, 8		WSW, 8	

* Position approximate.

* Barometer uncorrected.

NORTH PACIFIC OCEAN, MAY 1938

By WILLIS E. HURD

Atmospheric pressure.—For the third consecutive month, beginning with March 1938, pressure continued to be abnormally low over Aleutian waters and abnormally high in the neighborhood of Midway Island. Dutch Harbor in May 1938 had an average pressure of 29.51 inches, which is 0.33 inch below the normal; while Midway Island had an average pressure of 30.18, which is 0.13 above the normal. The Aleutian cyclone persisted throughout May and the lowest pressure reading of the month at Dutch Harbor, 28.80 inches, occurred as late as the 27th. The North Pacific anticyclone was practically ocean-wide in extent, with pressures above normal generally in middle latitudes.

Extratropical cyclones and gales.—Numerous cyclones appeared over northern waters of the North Pacific Ocean during May 1938. Although their combined result was an extraordinarily low average pressure for the month over the eastern Aleutians, yet none was of more than light to moderate energy. The most severe gale thus far reported by any ship in central and higher latitudes was only of force 9, barometer 29.14, experienced by the American steamer *President Jefferson* during the night of May 2-3, in the vicinity of 52° N., 158° W.

Practically all gales observed in connection with cyclones in extratropical waters occurred to the northward of the 40th parallel, between longitudes 175° E., and

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, May 1938, at selected stations

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	29.89	-0.20	30.44	6, 7	29.52	12
Dutch Harbor	29.51	-0.33	30.02	25	28.80	27
St. Paul	29.62	-0.22	30.06	14	28.98	27
Kodiak	29.71	-0.13	30.14	26	28.90	11
Juneau	30.00	+0.01	30.39	14	28.92	11
Tatoosh Island	30.11	+0.10	30.44	13	29.76	27
San Francisco	30.00	+0.01	30.23	4	29.77	16
Mazatlan	29.86	+0.01	29.94	18	29.78	30
Honolulu	30.00	-0.05	30.12	2	29.90	14
Midway Island	30.18	+0.13	30.33	19, 20	30.06	16
Guam	29.85	-0.03	29.92	11	29.77	6
Manila	29.79	+0.02	29.83	5, 20, 21, 24	29.71	9
Hong Kong	29.78	-0.00	29.98	9	29.40	3
Naha	29.85	+0.03	30.03	9	29.71	17, 18
Titijima	29.98	+0.07	30.15	14	29.77	18, 22

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

155° W. The greater number of these did not exceed 8 in force. They were reported on the 1st to 3d, 10th, 14th, 15th, 27th, and 30th. During the prevalence of the deepest cyclone of the month, over the eastern Aleutians, from the 26th to 28th, while only one force-8 gale was reported, yet there were winds of force 7 in the vicinity on all three dates.

On the 3d and 18th northerly gales of force 8 occurred off the central California coast along the eastern slope of the oceanic anticyclone.

Tropical cyclones and gales.—Subjoined is a report by the Rev. Bernard F. Doucette, S. J., Weather Bureau, Manila, P. I., of two typhoons which affected Philippine waters during May 1938. The typhoon of May 7–18 is noted as having been of hurricane intensity on the 14th. Early that morning the U. S. A. T. *Meigs*, in and near the vicinity of 19°20' N., 129°02' E., encountered winds of force 12 which lasted for several hours. Gales of lower force continued on ship through most of the 14th and even at midnight they had diminished only to force 7.

Fog.—Fog was the most important meteorological element of the month on the North Pacific, particularly in east longitudes, where the conditions of late spring and early summer usually bring it with considerable frequency. In several 5° squares along the western part of the northern steamer routes, and to the west-northwestward of Midway Island on the middle routes, fog occurred on 5 to 6 or more days. The American steamer *President Taft*, eastbound from Yokohama, reported such extensive fog banks east of Honshu on the 4th to longitude 166° E., in latitude 33° N., on the 7th, that a constant lookout had to be kept on account of it. East of midocean, fog was more widely scattered and less frequent. Off the California coast, ships reported fog on the 22d to 25th. During dense fog late on the 23d the American steamer *Walter A. Luckenbach* and the Japanese motorship *Arimasan Maru* collided outside of Los Angeles Harbor breakwater, with the result that much damage was done to both vessels.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST, MAY 1938

BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

Typhoon, April 28–May 5, 1938.—A low-pressure area appeared during the afternoon hours of April 28 about 120 miles east of northern Mindanao and moved, as a depression, along a west-northwesterly course across the Visayan Islands into the China Sea, where, April 30 to May 2, it inclined slightly to the northwest, thus reaching the Paracel Islands. There were no strong winds, nor did the pressure fall very much, and the disturbance seemed to be a depression of little importance.

Intensification began during the afternoon of May 2 as the center changed its course to the north-northeast. Moving more rapidly now, and inclining to the north, the typhoon (there was no doubt that it had intensified to this stage) passed about 100 miles southeast of Hong Kong and entered the China coast close to and west of Swatow shortly before dawn, May 4. It weakened somewhat after this as it was followed for two days, finally disappearing northwest of Shanghai.

The first indications of the strengthening of the storm came with observations received from the S. S. *Tjibadak*. May 3 at 8 a. m. when in latitude 17.3° N., longitude 117.3° E., a pressure of 750.83 mm (29.560 in.) with south-southwest winds, force 6, was reported. From Hong Kong, May 3, at 2 p. m., a pressure of 750.6 mm (29.551 in.) was the lowest of the synoptic observations received.

There are some interesting aspects to be found in a study of the upper winds over these regions as the depression intensified and became a typhoon. The critical period was May 2 and 3, as the depression recurved to the north-northeast and intensified. Indo-China reported only a few ascents before May 1, showing southeast, south, and south-southwest winds with velocities of 10 to 20 k. p. h. below 1,000 m. No pilots were broadcast on May 2. A northeasterly current, less than 20 k. p. h.,

backing to the northwest quadrant in the afternoon, was indicated on May 3. Above 1,500 m, northwest and southwest winds were found, with velocities of 10 to 35 k. p. h. Over Hong Kong, there were east winds, veering aloft to southeast and increasing in strength, from 15 to 50 k. p. h., on May 2, to values over 50 k. p. h. on May 3. On April 29, there were weak east and southeast winds over the Philippines. On the following days, the velocities increased, and from May 1 to 4, velocities from 30 to 60 k. p. h. were maintained. Zamboanga, it should be noted, had northwesterly winds at various levels on May 1 and 2. Over Malaya, westerly and southwesterly winds gradually predominated and increased in strength on April 29 and 30, so that on May 1 to 3, a definite current of air was flowing from the west-southwest and west with velocities from 10 to 30 k. p. h. These data indicate that strengthening winds from the southeast and southwest quadrants had some part in the intensification of the depression.

Typhoon, May 7–18, 1938.—A low pressure area formed over the ocean regions north of Palau, first appearing on May 7. A definite circulation with weak winds around a center and with pressure values slightly below normal, apparently of minor importance, best describes the disturbance, which moved along a westerly course to the Philippines. On May 9 it was central over the Visayan Islands and Luzon. The next day, still a low-pressure area, it was moving in a northwesterly direction with a tendency to incline northward, the center passing along central and northern Luzon. Up to this time, the lowest pressure reported was 753.5 mm (29.665 inches) as the storm moved over the Archipelago.

The morning weather map of May 12 indicated the center about 100 miles east-southeast of Aparri, after passing in a northeasterly direction across northern Luzon into the Pacific, this taking place a short distance north of Palanan, Isabela Pr. During the night, intensification had begun and the storm now manifested the strength of a typhoon. An easterly movement of about 300 miles in 24 hours preceded a change of path to the northeast and then to the north (the afternoon of May 14), the latter change occurring near latitude 20° N., longitude 130° E. On May 16 the center was located not far from latitude 24° N., longitude 130° E., from which position it again moved in a northeasterly direction, gradually inclining to the east-northeast as it disappeared east of northern Japan during the afternoon hours of May 18.

The U. S. A. T. *Meigs*, enroute from Manila to the United States, was traveling along a course almost parallel to that of the typhoon and north of the center. On May 13 and 14, when the typhoon changed its course to the northeast and later to the north, the ship came under the influence of the typhoon winds and seas, encountering heavy seas and winds of hurricane force. Of the many observations sent to the Observatory, that with the lowest barometer reading was made, most likely at noon, May 14 (the time of the observation could not be definitely determined from the radiogram, and verification could not be obtained in time for the preparation of this article), when the ship was in latitude 19° 12' N., longitude 129° 10' E., the value being 29.18 inches (741.17 mm), with south-southwest winds, force 6.

The pilot balloon observations made at Philippine stations during the course of this storm indicate an important factor in the intensification of the disturbance. While the center was over the Archipelago, the circulation was not strong, due very likely to the friction between the air and the land. The southwest quadrant winds at Cebu and Zamboanga were about 15 k. p. h. and at the same time, Manila and Aparri had east and southeast quadrant